(3 Hours) [Total Marks :80

N.B. : (1) Attempt any four questions out of six.
(2) Assume suitable data wherever required.

1. (a) Define 0, Ω, and θ notations. To find the complexity of given recurrence relation. 10
   (i) $T(n) = 4T(n/2) + n^2$
   (ii) $T(n) = 2T(n/2) + n^3$
   (b) Implement the binary search, and derive its complexity.
   10

2. (a) Explain 0/1 knapsack problem using dynamic programming
   (b) Explain optimal storage on tapes and find the optimal order for given instance. 10
   $n = 3$, and $(l_1, l_2, l_3) = (5, 10, 3)$. 10

3. (a) Let $n = 4$, $(p_1, p_2, p_3, p_4) = (100, 10, 15, 27)$ and
   $(d1, d2, d3, d4) = (2, 1, 2, 1)$. Find feasible solutions, using job sequencing 10
   with deadlines.
   (b) Find a minimum cost path from 3 to 2 in the given graph using dynamic
   programming. 10
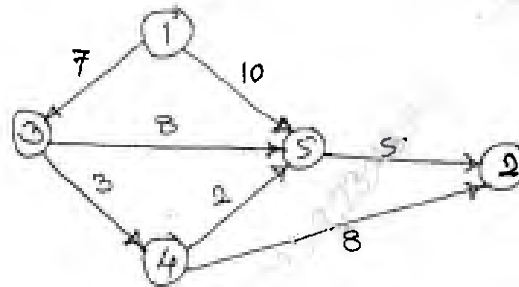
4. (a) Explain 8 Queen problem.
   (b) Explain sum of subset problem, Find all possible subsets of weight that sum 10
   to m, let $n = 6$, $m = 30$, and $w[1:6] = \{5, 10, 12, 13, 15, 18\}$ 10

5. (a) Write an algorithm for Kunth-Morrie-Pratt (KMP).
   (b) Explain the strassen's Matrix multiplication. 10
   10

6. Write note on (any two):-
   (i) Randomized Algorithms. 20
   (ii) Branch and bound strategy
   (iii) Huffman coding
   (iv) Rabin karp algorithm

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